

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4276 (1977): Soybean Oil [FAD 13: Oils and Oilseeds]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



IS : 4276 - 1977
(Reaffirmed 2000)
Edition 2.3
(2002-03)

Indian Standard
SPECIFICATION FOR SOYBEAN OIL
(First Revision)

(Incorporating Amendment Nos. 1, 2 & 3)

UDC 665.335.2

© BIS 2004

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Group 2

Indian Standard

SPECIFICATION FOR SOYBEAN OIL

(*First Revision*)

Oils and Oilseeds Sectional Committee, CAFDC 5

Chairman

PROF M. M. CHAKRABARTY

Representing

Oil Technologists' Association of India, Kanpur

Members

PROF A. C. GUPTA (<i>Alternate</i> to Prof M. M. Chakrabarty)	
AGRICULTURAL MARKETING ADVISER TO THE GOVT OF INDIA SHRI A. T. MATHEW (<i>Alternate</i>)	Directorate of Marketing & Inspection (Ministry of Agriculture), Nagpur
DR B. P. BALIGA DR N. L. MURTHY (<i>Alternate</i>)	The Tata Oil Mills Co Ltd, Bombay
SHRI M. A. BHATT SHRI R. B. BAROT (<i>Alternate</i>)	The Swastik Household & Industrial Products Ltd, Bombay
SHRI D. S. CHADHA	Central Committee for Food Standards (Directorate General of Health Services), New Delhi
SMT DEBI MUKHERJEE (<i>Alternate</i>)	
SHRI N. C. CHATTERJEE	National Test House, Calcutta
SHRI P. V. GUJARATHI SHRI V. LAKSHMIKANTHAN (<i>Alternate</i>)	Khadi & Village Industries Commission, Bombay
SHRI H. P. GUPTA SHRI R. R. MUSSADI (<i>Alternate</i>)	East India Oil Millers' Association, Calcutta
SHRI B. V. KANTAK SHRI M. S. THAKUR (<i>Alternate</i>)	Godrej Soaps Pvt Ltd, Bombay
DR A. R. S. KARTHA	Indian Council of Agricultural Research, New Delhi
SHRI R. D. KAWATRA	Directorate General of Technical Development, New Delhi
DR G. LAKSHMINARAYANA	Regional Research Laboratory (CSIR), Hyderabad
DR S. N. MAHAPATRA DR C. SRINIVASULU (<i>Alternate</i>)	Regional Research Laboratory (CSIR), Bhubaneswar
SHRI J. P. PATEL SHRI J. C. DEY (<i>Alternate</i>) (Calcutta)	Italab Pvt Ltd, Bombay
SHRI S. S. HONAVAR (<i>Alternate</i>) (Madras)	
DR S. M. PATEL	Hindustan Lever Ltd, Bombay
SHRI K. BALAKRISHNAN (<i>Alternate</i>)	

(*Continued on page 2*)

© BIS 2004

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Representing

SHRI M. K. RAHMAN	Solvent Extractors' Association of India, Bombay
SHRI L. KRISHAN KUMAR (<i>Alternate</i>)	
SHRI P. RAMDAS	Central Warehousing Corporation, New Delhi
SHRI S. SAMPATH KUMAR (<i>Alternate</i>)	
DR A. K. SEN	Ministry of Defence (DGI)
SHRI P. N. AGARWAL (<i>Alternate</i>)	
SHRI HARISH SETHI	Directorate of Oilseeds Development (Ministry of Agriculture), Hyderabad
SHRI S. C. SINGHAL	The Vanaspati Manufacturers' Association of India, Bombay
DR M. R. SUBBARAM	Directorate of Sugar & Vanaspati (Ministry of Agriculture), New Delhi
DR I. A. SIDDIQI (<i>Alternate</i>)	
SHRI S. D. THIRUMALA RAO	Oil Technological Research Institute, Anantapur
SHRI D. ATCHUTARAMAYYA (<i>Alternate</i>)	
DR G. M. SAXENA,	Director General, ISI (<i>Ex-officio Member</i>)
Director (Chem)	

SHRI R. K. SINGH
Assistant Director (Chem), ISI

Convenor

DR S. M. PATEL

Hindustan Lever Ltd, Bombay

SHRI K. BALAKRISHNAN (<i>Alternate</i> to Dr S. M. Patel)	
SHRI G. J. AGARWAL	Bombay Oilseeds and Oils Exchange Ltd, Bombay
SHRI C. V. MARIWALA (<i>Alternate</i>)	
DR A. C. CHHATRAPATI	The Vanaspati Manufacturers' Association of India, Bombay
SHRI P. V. GUJARATHI	Khadi & Village Industries Commission, Bombay
SHRI V. LAKSHMIKANTHAN (<i>Alternate</i>)	
DR A. R. S. KARTHA	Indian Council of Agricultural Research, New Delhi
SHRI R. D. KAWATRA	Directorate General of Technical Development, New Delhi
DR G. LAKSHMINARAYANA	Regional Research Laboratory (CSIR), Hyderabad
SHRI R. K. MARPHATIA	The Indian Paints Association, Calcutta
SHRI M. N. RAO (<i>Alternate</i>)	
SHRI T. V. MATHEW	Directorate of Marketing & Inspection (Ministry of Agriculture), Nagpur
DR N. L. MURTHY	The Tata Oil Mills Co Ltd, Bombay
DR A. D. SHITOLA (<i>Alternate</i>)	
SHRI RAJESHWAR PRASAD	Oil Technologists' Association of India, Kanpur
PROF V. V. R. SUBRAHMANYAM (<i>Alternate</i>)	
DR A. K. SEN	Ministry of Defence (DGI)
SHRI P. N. AGARWAL (<i>Alternate</i>)	
SHRI HARISH SETHI	Directorate of Oilseeds Development (Ministry of Agriculture), Hyderabad
DR M. R. SUBBARAM	Directorate of Sugar & Vanaspati (Ministry of Agriculture), New Delhi
DR I. A. SIDDIQI (<i>Alternate</i>)	
SHRI M. S. THAKUR	Godrej Soaps Pvt Ltd, Bombay
SHRI S. D. THIRUMALA RAO	Oil Technological Research Institute, Anantapur
SHRI D. ATCHYUTARAMAYYA (<i>Alternate</i>)	

Indian Standard
SPECIFICATION FOR SOYBEAN OIL
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 12 January 1977, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council and the Agricultural and Food Products Division Council.

0.2 This standard was first published in 1967 in order to regulate the quality of refined soybean oil produced in the country from imported soybean oil. Now that the cultivation of soybeans has started on bigger scale in the country and substantial amount of soybean oil is produced indigenously, need was felt to revise this standard to cover the oil based on indigenously available data.

0.3 This revision covers raw soybean oil along with degummed, semi-refined and refined oil. The title of the standard has, therefore, been suitably modified. This standard covers imported soybean oil as well. Insofar as edible grade of the oil is concerned this standard takes care of the provisions of the Prevention of Food Adulteration (PFA) Rules, 1954, as modified from time to time.

0.4 Methods for grading of soybeans for oil milling are covered in IS : 7797-1975*.

0.5 In the preparation of this standard substantial assistance has been derived from data supplied by M/s Prag Ice & Oil Mills, Aligarh; Oil Technological Research Institute, Anantapur; and Indian Soybean Processors' Association, Indore (MP), which is gratefully acknowledged.

0.6 This standard contains clause 5.1 which calls for agreement between the purchaser and the supplier.

0.7 A scheme for labelling environment friendly products to be known as ECO Mark has been introduced at the instance of the Ministry of Environment and Forests (MEF). The ECO Mark shall be administered by the Bureau of Indian Standards (BIS) under the BIS Act, 1986 as per the Resolution No. 71 dated 20 February 1991 as

*Grading for soybeans for oil milling.

published in the Gazette of the Government of India vide GSR 85(E) dated 21 February 1991. For a product to be eligible for marking with the ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional optional environment friendly (EF) requirements. The EF requirements for soybean oil are therefore being included through an Amendment No. 2.

Amendment No. 2 is based on the Gazette Notification No. 678 dated 30 August 1994 for Labelling Edible Oils, Tea and Coffee as environment friendly products, published by the Ministry of Environment and Forests.

0.8 This edition 2.3 incorporates Amendment No. 1 (June 1989), Amendment No. 2 (September 1995) and Amendment No. 3 (March 2002). Side bar indicates modification of the text as the result of incorporation of the amendments.

0.9 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for soybean oil.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given under 2 of IS : 548 (Part I)-1964† and the following shall apply.

2.1.1 *Semi-refined Soybean Oil* — Soybean oil obtained by the process of solvent extraction which has been neutralized with alkali, without or with bleaching with bleaching earth or activated carbon or both, no other chemical agents being used.

2.1.2 *Refined Soybean Oil* — Soybean oil obtained by the process of expression or solvent extraction which has been neutralized with alkali, bleached with bleaching earth or activated carbon or both, and deodorized with steam, no other chemical agents being used.

*Rules for rounding off numerical values (*revised*).

†Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (*revised*).

3. GRADES

3.1 The material obtained by the process of solvent extraction shall be of following grades:

- a) Refined grade,
- b) Semi-refined grade,
- c) Degummed grade,
- d) Raw grade 1, and
- e) Raw grade 2.

3.1.1 Refined grade of the oil is suitable for direct edible consumption.

3.1.2 Raw grade 1, degummed and semi-refined grades of the oil are suitable for making *VANASPATI* and refined oil only and not for direct edible consumption.

3.1.3 Raw grade 2 of the oil is intended for industrial uses other than *VANASPATI* and refined oil manufacture.

4. REQUIREMENTS

4.1 Description — The material shall be obtained from good quality soybeans from the plant *Glycine* Max (L) Merrill Syn. *Glycine Soja* Sieb and Zucc., fam. Leguminosae by a process of solvent extraction.

4.1.1 The solvent extracted oil shall be obtained from the oleaginous material using solvent hexane conforming to IS : 3470-1966*.

4.2 The material shall be clear and free from adulterants, sediment, suspended and other foreign matter, separated water, and added colouring and flavouring substances. The material shall have acceptable taste and odour and when tested as prescribed in **20** of IS : 548 (Part I)-1964† the peroxide value of the oil shall not exceed 10. It may contain permitted antioxidants in quantities prescribed under the Prevention of Food Adulteration (PFA) Rules of the Government of India.

4.2.1 The clarity of the material shall be judged by the absence of turbidity after keeping the filtered sample at 30°C for 24 hours.

4.3 Admixture with Other Oils — The material shall be free from admixture with other oils, when tested according to the methods prescribed in IS : 548 (Part II)-1976‡.

4.4 The material shall also comply with the requirements given in Table 1.

*Specification for hexane, food grade.

†Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (*revised*).

‡Methods of sampling and test for oils and fats: Part II Purity tests (*third revision*).

TABLE 1 REQUIREMENTS FOR SOYBEAN OIL

(Clause 4.4)

SL No.	CHARACTERISTIC	REQUIREMENTS FOR GRADE					METHOD OF TEST (REF TO CL NO.)
		Re- fined	Semi- refined	De- gum- med	Raw Grade 1	Raw Grade 2	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Moisture and insoluble impurities, percent by mass, <i>Max</i>	0.10	0.25	0.5	0.5	0.75	5 & 6
ii)	Colour in a 1/4-in cell on the Lovibond scale expressed as $Y + 5R$, not deeper than	7.5	7.5	40	40	—	13
iii)	Refractive index at 40°C	← 1.465 0 to 1.471 0 →					10
iv)	Saponification value	← 189 to 195 →					15
v)	Iodine value (Wijs)	← 125 to 140 →					14
vi)	Acid value, <i>Max</i>	0.5	0.75	6	6	25	7
vii)	Unsaponifiable matter, percent by mass, <i>Max</i>	1.0	1.2	1.2	1.5	2	8
viii)	Flash point, Pensky-Martens (closed), °C, <i>Min</i>	250	125	100	100	90	P : 21 (1960) of IS : 1448†
ix)	Insoluble bromide test	← To pass the test →					Appendix A
x)	Phosphorus content	← To pass the test →					No visible break on heating the oil at 250°C

*Method of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (*revised*).

†Methods of test for petroleum and its products: [P : 21] Flash point (closed) by Pensky-Martens apparatus.

4.5 Optional Requirements for ECO Mark

4.5.1 General Requirements

4.5.1.1 The product shall conform to the requirements of quality prescribed under clauses **4.1** to **4.4**.

4.5.1.2 The manufacturers shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the norms laid down under the *Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Cess Act, 1977*, respectively, along with the authorization, if required under the *Environment (Protection) Act, 1986*, while applying for ECO Mark.

4.5.2 Specific Requirements

4.5.2.1 The product shall not contain aflatoxin, more than 5 µg/kg, when tested by the method prescribed in Appendix B.

4.5.2.2 The pesticide residues, if any, shall not exceed the tolerance limits as prescribed in the *Prevention of Food Adulteration Act, 1954* and Rules made thereunder.

4.5.2.3 Only permitted antioxidants not exceeding the quantities specified against each as prescribed under the *Prevention of Food Adulteration Act, 1954* and *Rules made thereunder*, shall be used, if required.

4.5.2.4 The product shall not contain any of the toxic metals in excess of the quantities prescribed in Table 2.

TABLE 2 LIMITS FOR TOXIC METALS

SL NO.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
i)	Lead, mg/kg, <i>Max</i>	5.0	15 of IS 1699 : 1995*
ii)	Arsenic, mg/kg, <i>Max</i>	0.5	do
iii)	Cadmium, mg/kg, <i>Max</i>	1.0	do
iv)	Mercury (total), mg/kg, <i>Max</i>	0.25	do

*Methods of sampling and test for food colours (*second revision*).

5. PACKING

5.1 The material shall be supplied in suitably sealed and well-closed containers, as agreed to between the purchaser and the supplier.

5.1.1 For ECO Mark the product shall be packed in such packages which are made from recyclable (that is which can be re-processed to manufacture any useful product) or biodegradable materials.

6. MARKING

6.1 The containers shall be marked with the following particulars:

- a) Name and grade of the material;
- b) Net mass of the material;
- c) A statement that permitted antioxidants have been added in prescribed quantities, if added;
- d) Manufacturer's name and/or his recognized trade-mark, if any;
- e) Batch No. or lot No. in code or otherwise; and
- f) Month and year of manufacture.

6.2 BIS Certification Marking

The product may also be marked with Standard Mark.

6.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6.3 For ECO Mark the containers shall be marked with the following information:

- a) List of identified critical ingredients in descending order of quantity, percent by mass, which shall include 'made from soybean oil';
- b) The brief criteria for which the product has been labelled for ECO Mark; and
- c) Shelf life of the product.

6.4 In addition, in case of grades which are not suitable for direct edible consumption the following information shall be suitably marked, either printed on label affixed to the container or lithographed or stencilled thereon with indelible ink in a type size of not less than 50 mm:

- a) Raw grade 1, degummed and semi-refined grades — 'NOT FOR DIRECT EDIBLE CONSUMPTION'.
- b) Raw grade 2 — 'FOR INDUSTRIAL NON-EDIBLE USES ONLY'.

7. SAMPLING

7.1 Representative samples of the material shall be drawn as prescribed under **3** of IS : 548 (Part I)-1964*.

8. TEST METHODS

8.1 Tests shall be carried out in accordance with the methods prescribed in IS : 548 (Part I)-1964*, IS : 548 (Part II)-1976†, IS : 1448 [P : 21]-1960‡ and Appendix A as specified in col 8 of Table 1.

8.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960§) shall be used in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

APPENDIX A

[Table 1, Item (ix)]

TEST FOR INSOLUBLE BROMIDES

A-1. PROCEDURE

A-1.1 Dissolve in a test tube about 6 g of the material in 12 ml of a mixture of equal parts of chloroform and acetic acid. Add bromine, dropwise, until a slight excess is indicated by the colour, keeping the solution at 20°C. Allow the mixture to stand for at least 15 minutes and place the test tube in boiling water.

A-1.2 The material shall be taken to have passed the test if the solution when kept in boiling water, does not become cloudy on account of insoluble bromides.

*Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (*revised*).

†Methods of sampling and test for oils and fats: Part II Purity tests (*third revision*).

‡Methods of test for petroleum and its products : [P : 21] Flash point (closed) by Pensky-Martens apparatus.

§Specification for water, distilled quality (*revised*).

APPENDIX B

(Clause 4.5.2.1)

DETERMINATION OF AFLATOXIN

B-1 REAGENTS

B-1.1 Acetone, 70 Percent — 700 ml acetone in 300 ml distilled water.

B-1.2 Acetone, 20 Percent — 200 ml acetone in 800 ml distilled water.

B-1.3 Lead Acetate, 20 Percent — 200 g neutral acetate in distilled water and 3 ml glacial acetic acid, diluted to one litre.

B-2 PROCEDURE

B-2.1 Dissolve 30 g sample in 100 ml hexane.

B-2.2 Extract with 3×50 ml 70 percent acetone.

B-2.3 To the extract add 60 ml distilled water and 20 ml lead acetate.

B-2.4 Boil to reduce volume to 150 ml. Cool to about 20°C.

B-2.5 Filter and wash with 20 percent acetone.

B-2.6 Extract filtrate and washings with 3×50 ml chloroform.

B-2.7 Pass chloroform layer through anhydrous sodium sulphate.

B-2.8 Concentrate to 50 ml and spot on TLC plate.

B-3 CALCULATION

$$\text{Aflatoxin, mg/kg} = \frac{V \times s \times 1\,000}{v \times m}$$

where

V = volume of extract in ml,

v = volume of extract giving minimum observable fluorescence in μl ,

m = mass of sample in g, and

s = standard toxin giving minimum observable fluorescence in μg .

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed by Technical Committee : CAFDC 5 and amended by FAD 44

Amendments Issued Since Publication

Amend No.	Date of Issue
Amd. No. 1	June 1989
Amd. No. 2	September 1995
Amd. No. 3	March 2002

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002.
Telephones: 323 01 31, 323 33 75, 323 94 02

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Telephone

{ 323 76 17
323 38 41

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi
KOLKATA 700054

{ 337 84 99, 337 85 61
337 86 26, 337 91 20

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

{ 60 38 43
60 20 25

Southern : C. I. T. Campus, IV Cross Road, CHENNAI 600113

{ 235 02 16, 235 04 42
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

{ 832 92 95, 832 78 58
832 78 91, 832 78 92

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW.
NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM.
VISHAKHAPATNAM